Solutions for Innovation JEOL

BS-04xxxSSR/ BS-041xxSSH

Maintenance Manual

JEOL Ltd.

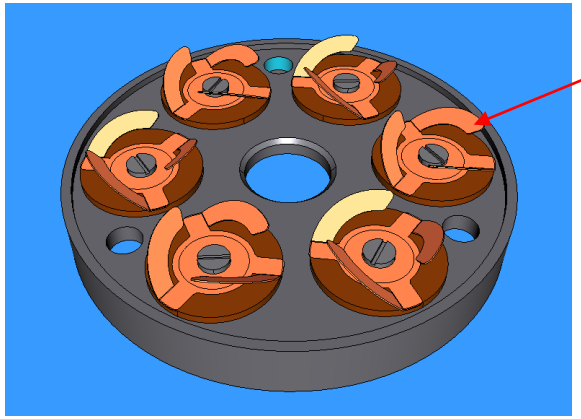
Rotary Sensor/
Rotary Sensor Head

JEOL
Solutions for Innovation

Conditions of spring disks

Make sure that there is no severe damage on the spring disks.

If a scratch and/or a contamination on the lifted contacts is found, replace the spring disk with new one.

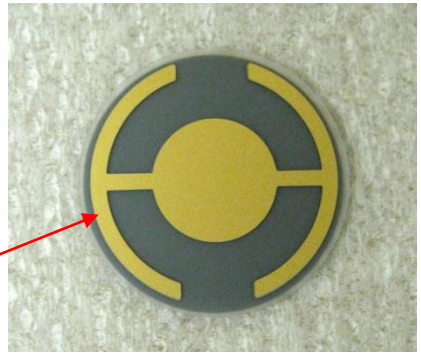


spring disk

- **Do not handle spring disks with bare hands.**
- **Do not push down or pull up the lifted contacts.**
  Crystal oscillation might be unstable.

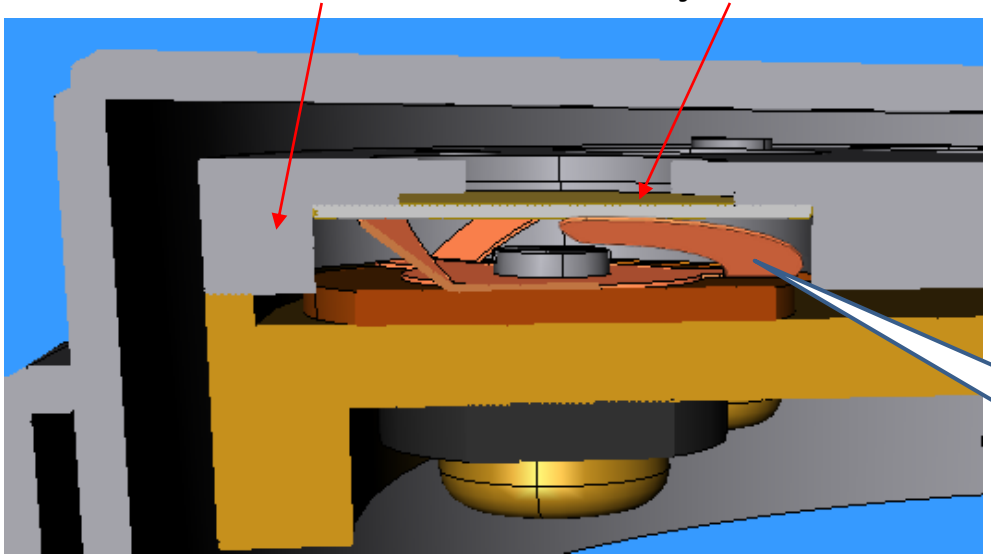
If the electrode on a crystal is damaged,
check the spring disk and replace it if necessary.

<back-side electrodes>
Check if there is no severe damage on it.

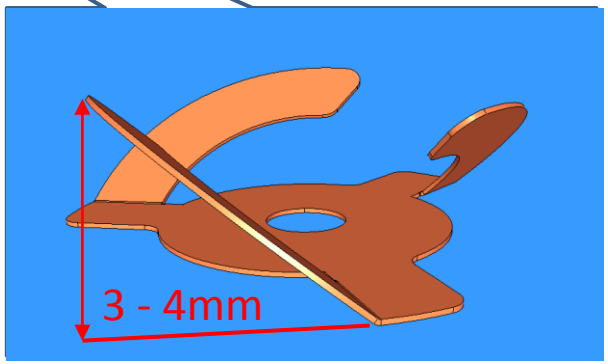


Conditions of spring disks

Firm contact between a spring disk and the outer electrodes on a crystal enables a stable performance.



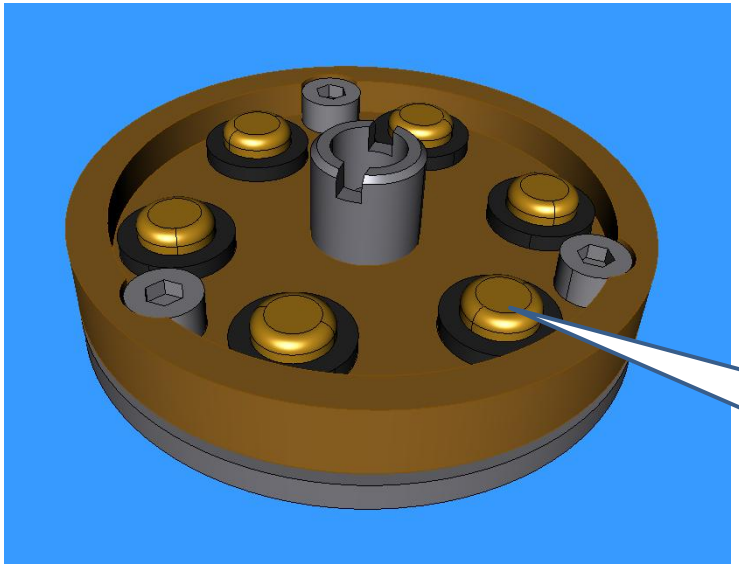
Do not pull up the contacts !



- **Make sure that the height of each contact is in the range of 3 - 4mm. Do not pull up the contacts higher than 4mm.**
  It might lead to a damage of a back-side electrode on a crystal and/or a unstable oscillation.

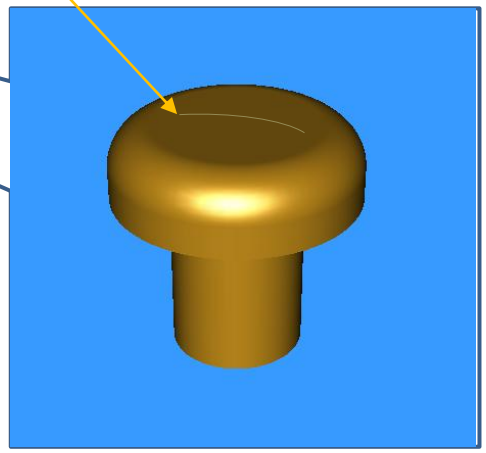
Conditions of electrodes

By sensor head rotation, the surface of a electrode is worn gradually.
Check the condition of the electrodes at fixed intervals.



If a electrode head is scratched severely just after a replacement, check the condition of leaf springs.

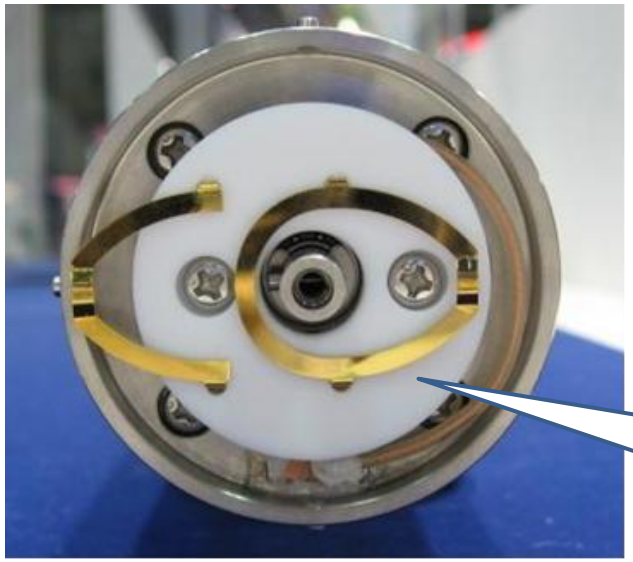
*Slight wear truck is not a critical issue for a stable performance.



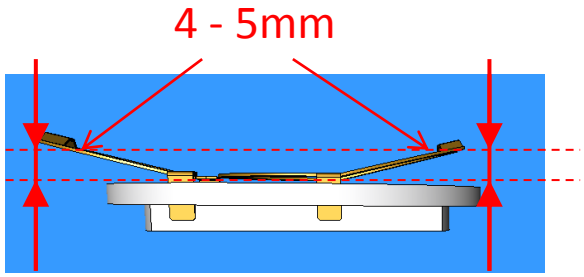
- **Do not touch the electrode head with bare hands.**
- **Do not polish it with a rough sandpaper or a file.**
  It might cause a poor contact with a leaf spring and/or an instability of a sensor head rotation.

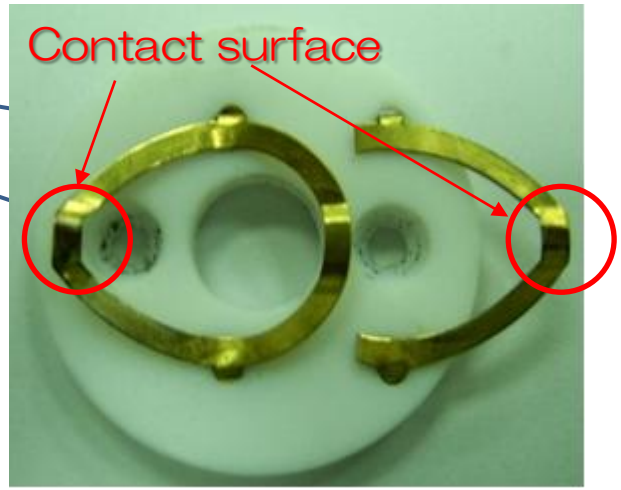
Conditions of leaf contacts

By sensor head rotation, the surface of a leaf contact is worn gradually. Check the condition of the leaf contacts on the contact unit at fixed intervals.



- **Do not handle the leaf contacts with bare hands.**
- **Do not push down or pull up the leaf contacts.**
  ***The height of the leaf contacts from the base plate must be in the range of 4 - 5mm.**
- **If the leaf contact deformed, replace it immediately.**
  It might cause a poor contact with a electrode and/or an instability of a sensor head rotation.



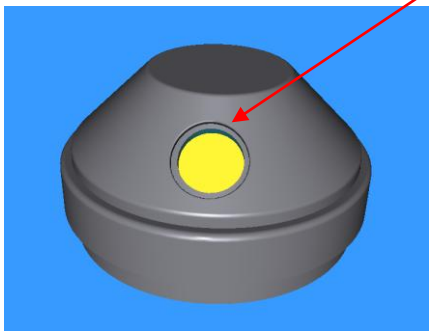


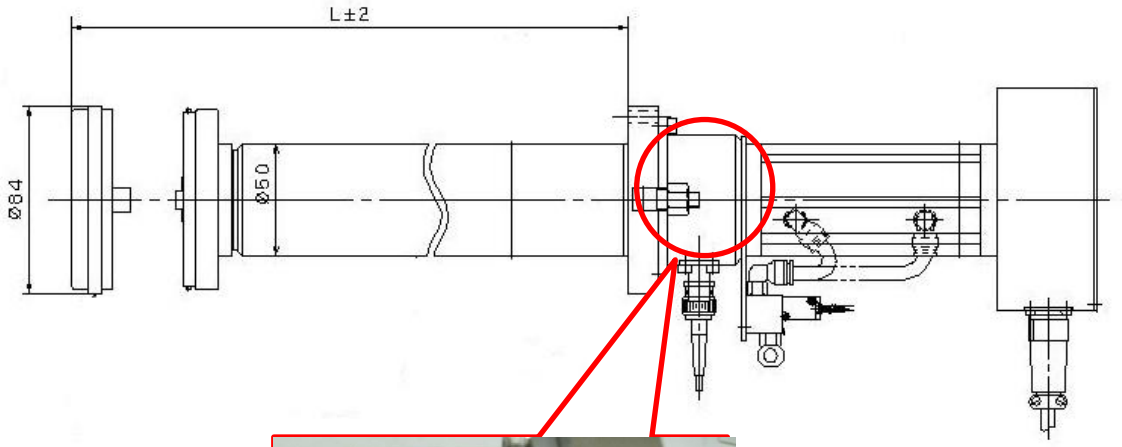
Displacement of crystal positioning

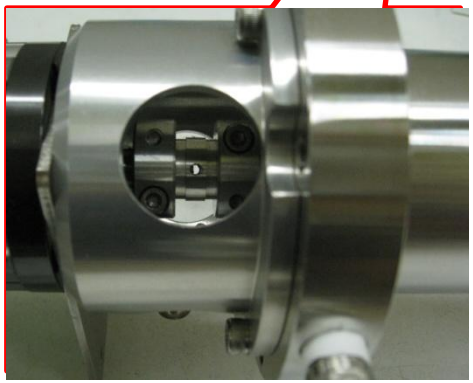
If there is a problem with a positioning accuracy and unstable oscillation, adjust the coupling depicted below.

*Please refer to the instruction for the procedure of the positioning.

The position of each crystal should be at the center of the cover-window.



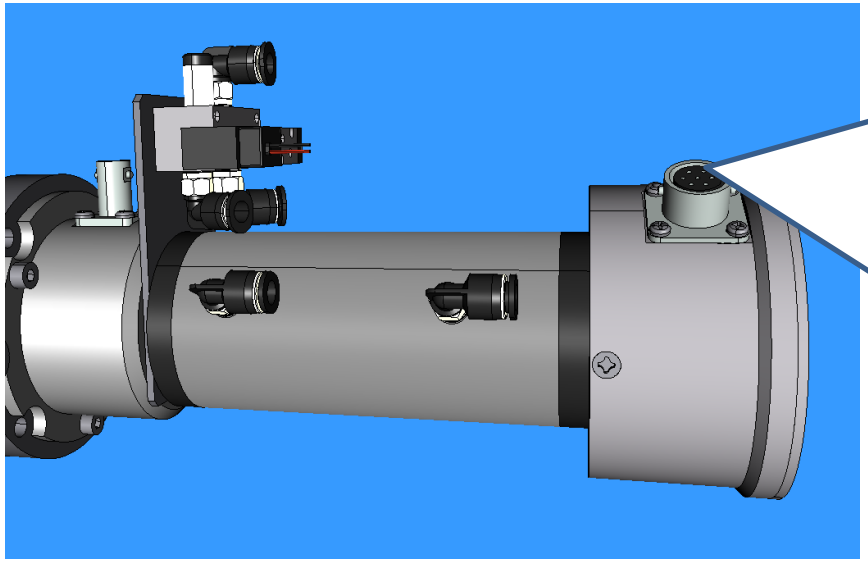




Coupling for adjustment

Failure of the position sensing circuit

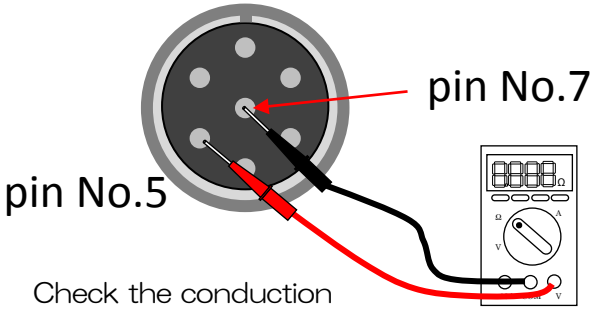
If there is a possibility of a failure of the position sensing circuit, please contact your JEOL service office.



When a detection error occurred, check the cable connection on the sensing part. If the error occurs only at a specific position, carry out the conduction test as described in this page.

Example) Detection error of the sensor No.5

Check the sensor position from the window. (No.5)



Check the conduction between the Pin No.5 and Pin No.7.

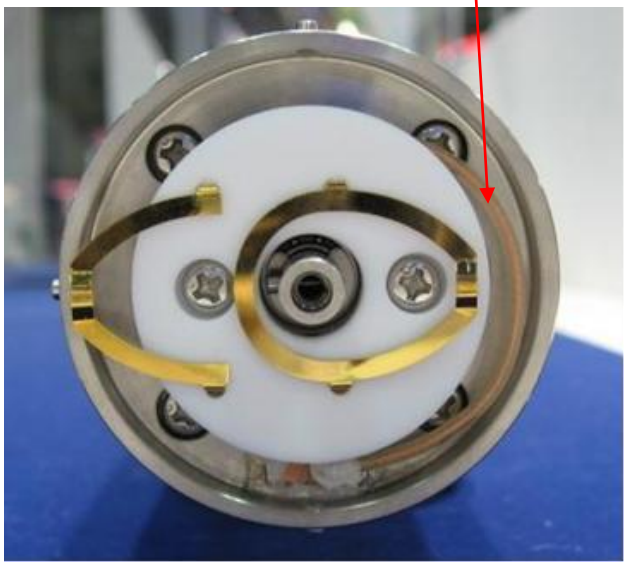
If the conduction state is normal, check if control equipment works normally.

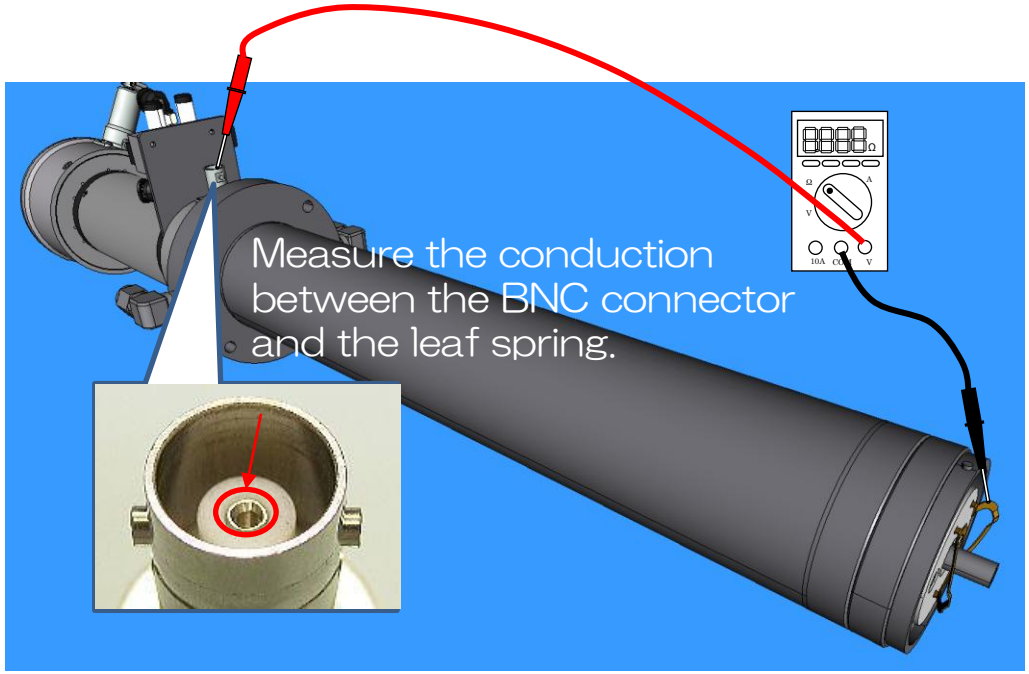
Conduction failure between electrodes

If the crystal failure occurs at all positions, please check the sensor hardware as follows:

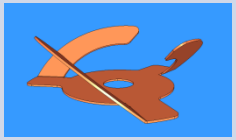
1) Check the condition of the leaf springs as described in page 6.
2) Check whether there is a loose connection of the cable between the contact spring unit and the sensor electrode.
3) Please contact your JEOL service office if there is a possibility of the conduction failure in the sensor body.

Check the cable connection.





Maintenance parts list

No.	Name	Figure	Parts No.	
1	Contact RH108 (BS-04120SSH)		780450868	For flat sensor head Replacement interval: 1 year
2	Contact RH206 (BS-04130SSH)		821255088	For 45° sensor head Replacement interval: 1 year
3	Spring disk		821135121	

Case examples of monitoring problem

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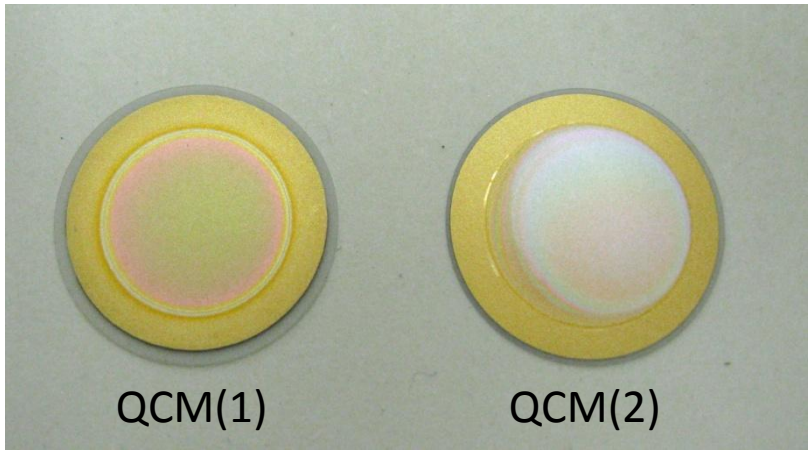
Case example（1）

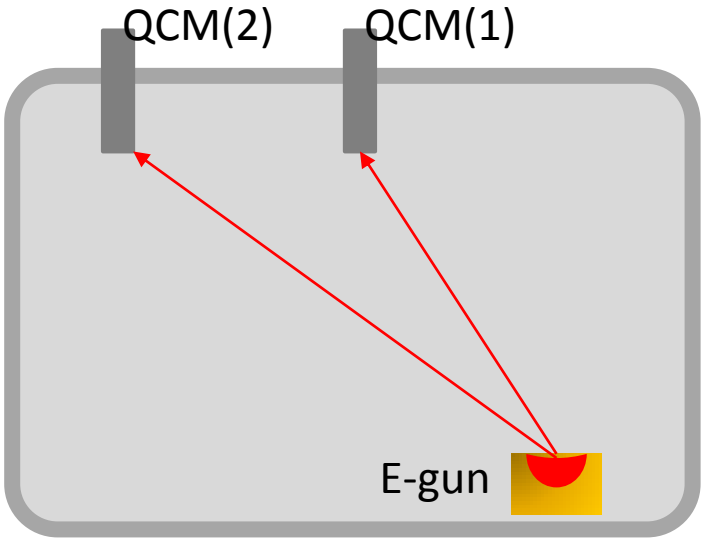
1）Uneven coating on crystal

If a stream of evaporation material enters obliquely to crystals, there is a possibility of unstable oscillation and/or short life time due to uneven coating on crystals.

Action

Redesign of the layout of QCM

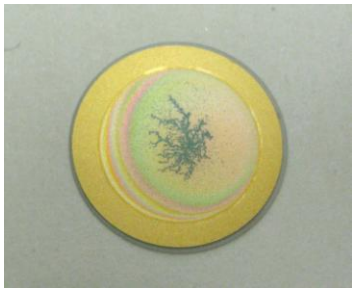




Case example（2）

2）Arcing due to ion source or plasma source conditions

In case of insufficient neutralization of the positive charge, an arcing occurs and results in a crystal fail.

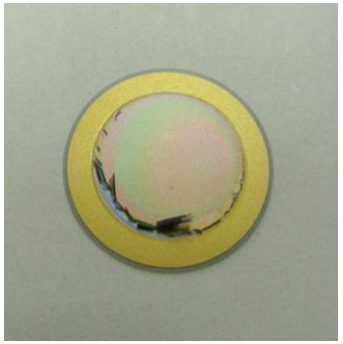


Action

Check parameters and conditions of an ion source or a plasma source.

3）Peel-off of films

If a peel-off of coatings on a crystal occurs, oscillation frequency increases drastically and QCM can not continue the monitoring.



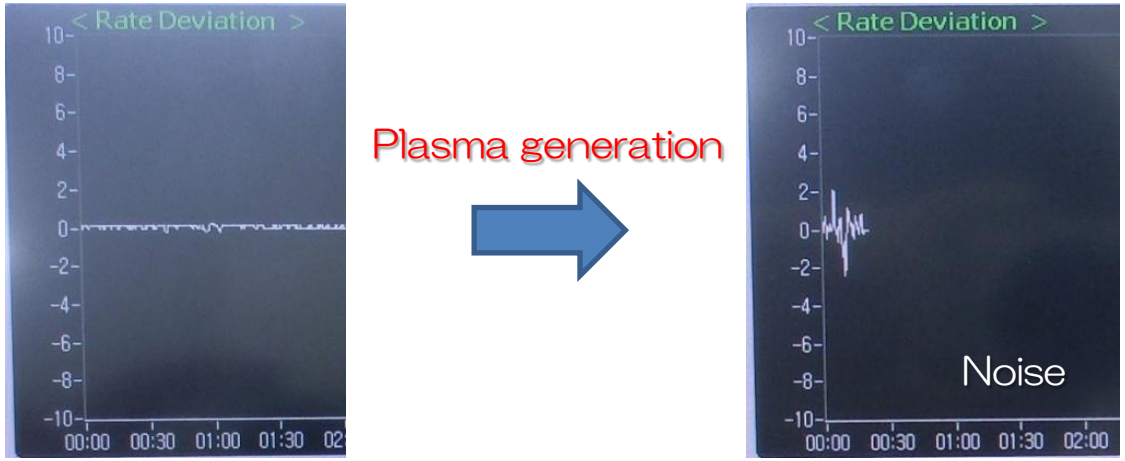
Action

- Review the number of evaporation materials per one crystal
- Review the cycle of crystal replacement

Case example（3）

4）Monitoring noise induced by high density plasma

If a high density plasma is generated in monitoring environment, the monitoring value might be unstable due to an impingement of high energy electrons.



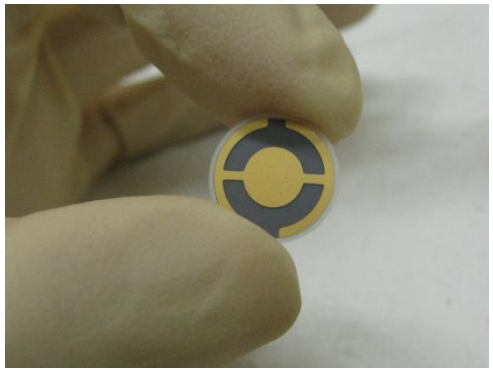
Action

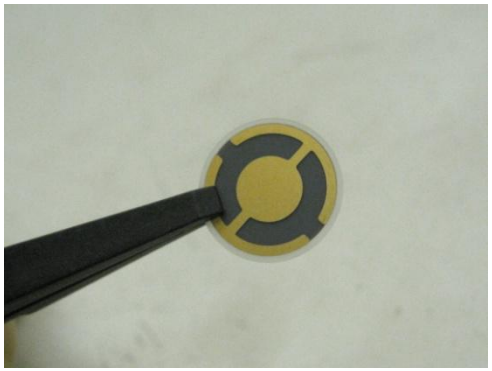
- Redesign of the layout of QCM
- Making a electron shield by magnetic field

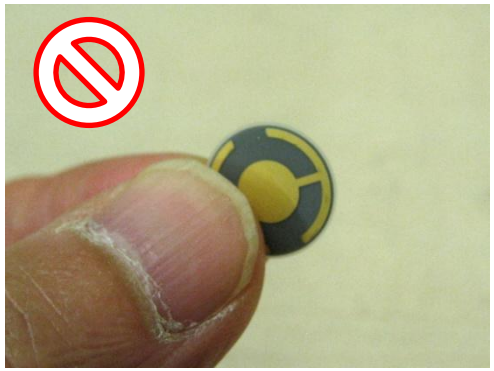
Handling of crystal

1）Handling of crystals

Handling crystals with bare hands causes performance deterioration.
Be sure to put rubber gloves or use tweezers when handling.







2）Storage

Store crystals in a desiccator.
Do not store crystals in dust-laden environment.